

Serial No. 10/060,737

PATENT
Docket No. 58027-011100**AMENDMENTS TO THE CLAIMS**

Claim 1 (amended): A system for mixing and combusting chemicals in a micro-machined chemical-mixing device, the system having~~A micro-machined chemical-mixing device:~~

walls of the device forming a chamber having an outlet;

an evaporator adjacent the chamber for evaporating a fluid reactant supplied through a non-pressurized inlet and introducing the evaporated fluid reactant into the chamber;

a feed path for supplying the fluid reactant to the evaporator;

an initiator for igniting the evaporated fluid reactant in the chamber;

first inlet for introducing a non-pressurized oxidizer into the chamber for forming a mixture of the evaporated fluid and the oxidizer;

the initiator providing energy to combust the mixture of the evaporated fluid and the oxidizer, thereby sending a pressure wave through an outlet;

the combustion of the evaporated fluid generating an acoustic wave, said acoustic wave being used to draw the oxidizer from the first inlet into the chamber;

a subsequent combustion being provided by a wavefront of the acoustic wave, after the device achieves operational temperature and operational acoustic frequency; and

~~wherein the evaporator includes a structure, wherein said structure including non-porous materials for increasing surface adhesion of the non-pressurized fluid reactant and flow of the fluid~~

wherein the evaporator includes a membranous pad having a plurality of patterned holes and grooves for increasing surface adhesion of the non-pressurized fluid reactant and flow of the fluid.

Claim 2 (cancelled)

Claim 3 (previously presented): The device of Claim 2, wherein the oxidizer is in a gas phase.

Claim 4 (previously presented): The device of Claim 3, wherein the gas is ambient air.

Serial No. 10/060,737

PATENT
Docket No. 58027-011100

Claim 5 (previously presented): The device of Claim 2, wherein the fluid reactant is evaporated into the chamber by the evaporator and mixed with the oxidizer to form a reacting mixture.

Claim 6 (cancelled)

Claim 7 (cancelled)

Claim 8 (previously presented): The device of Claim 1, wherein the feed path includes at least one channel for delivering the fluid to the evaporator, said feed path being designed to aid evaporation.

Claim 9 (cancelled)

Claim 10 (previously presented): The device of Claim 1, wherein the evaporator, the chamber and the initiator are formed from at least one of silicon, plastic, ceramic, and glass based material, the material being selected based upon operating temperature.

Claim 11 (previously presented): The device of Claim 1 wherein the evaporator is located substantially adjacent to and gaseously connected to the chamber to convert a chemicals from a liquid phase into a gaseous phase chemical for introduction into the chamber.

Claim 12 (previously presented): The device of Claim 2, wherein at least two different fluids are supplied to the evaporator by at least two separate inlets for mixing with the oxidizer.

Claim 13 (cancelled)

Claim 14 (previously presented): The device of Claim 12, wherein the oxidizer is a gas supplied from outside the device and introduced to the chamber through an inlet passing through the walls of the chamber for mixing with at least two different evaporated fluids within the chamber.

Serial No. 10/060,737

PATENT
Docket No. 58027-011100

Claim 15 (previously presented): The micro device of Claim 1, wherein the initiator comprises at least one of a spark or glow wires to provide initial combustion and engine throttle control.

Claim 16 (cancelled)

Claim 17 (previously presented): The device of Claim 2, further including at least one temperature sensor for detecting efficient mixing between the oxidizer and the fluid, said at least one temperature sensor being part of the chamber.

Claim 18 (previously presented): The device of Claim 17, further including at least one pressure sensor for detecting efficient mixing between the oxidizer and the fluid.

Claim 19 (previously presented): The device of Claim 1 wherein the device contains no valves, chemical pumps, pressurized chemical lines or pumps for operation of said device.

Claim 20 (withdrawn): A method for releasing energy from an outlet of a chamber of a micro-machined chemical-mixing device comprising the steps of:

- supplying liquid to an evaporator through a liquid feed path;
- evaporating the liquid from the evaporator into the chamber;
- providing initial or sustained energy to react the evaporated liquid thereby causing the release of energy from the outlet of the chamber of the micro-machined chemical mixing device.

Claim 21 (cancelled)

Claim 22 (previously presented): The device of Claim 21 wherein the evaporator delivers the chemical in a non-pressurized state to the chamber.

Claim 23 (cancelled)

Claim 24 (cancelled)

Claim 25 (cancelled)

Serial No. 10/060,737

PATENT
Docket No. 58027-011100

Claim 26 (previously presented): The device of Claim 1 wherein the device contains no moving mechanical parts.

Claim 27 (currently amended): A system for mixing and combusting chemicals in a micro-machined chemical-mixing device, the system having ~~A micro-machined chemical-mixing device comprising:~~

- walls of the device forming a chamber having an outlet;
- an evaporator adjacent the chamber for evaporating a fluid reactant supplied through a non-pressurized inlet and introducing the evaporated fluid reactant into the chamber;
- a feed path for supplying the fluid reactant to the evaporator;
- an initiator for igniting the evaporated fluid reactant in the chamber; and
- ~~the chamber being formed to permit resonance in said chamber with a standing wave.~~
- a first inlet for introducing a non-pressurized oxidizer into the chamber for forming a mixture of the evaporated fluid and the oxidizer;
- the initiator providing energy to combust the mixture of the evaporated fluid and the oxidizer, thereby sending a pressure wave through an outlet;
- the combustion of the evaporated fluid generating an acoustic wave, said acoustic wave being used to draw the oxidizer from the first inlet into the chamber;
- a subsequent combustion being provided by a wavefront of the acoustic wave; and
- wherein the evaporator includes a membranous pad having a plurality of patterned holes and grooves for increasing surface adhesion of the non-pressurized fluid reactant and flow of the fluid.

Claim 28 (previously presented): The device of Claim 27 wherein the evaporator includes a membranous pad having formations to increase surface adhesion of the non-pressurized fluid reactant and flow of the fluid.

Claim 29 (cancelled)

Claim 30 (cancelled)

Serial No. 10/060,737

PATENT
Docket No. 58027-011100**Claim 31 (cancelled)**

Claim 32 (currently amended): A system for mixing and combusting chemicals in a micro-machined chemical-mixing device, the system having ~~A micro-machined chemical-mixing device comprising:~~

walls of the device forming a chamber having an outlet;

an evaporator adjacent the chamber for evaporating a fluid reactant supplied through a non-pressurized inlet and introducing the evaporated fluid reactant into the chamber;

a feed path for supplying the fluid reactant to the evaporator; ~~and~~

an initiator for igniting the evaporated fluid reactant in the chamber;

~~wherein the evaporator includes a structure for precluding an external power source.~~

a first inlet for introducing a non-pressurized oxidizer into the chamber for forming a mixture of the evaporated fluid and the oxidizer;

the initiator providing energy to combust the mixture of the evaporated fluid and the oxidizer, thereby sending a pressure wave through an outlet;

the combustion of the evaporated fluid generating an acoustic wave, said acoustic wave being used to draw the oxidizer from the first inlet into the chamber;

a subsequent combustion being provided by a wavefront of the acoustic wave, after the device achieves operational temperature and operational acoustic frequency; and

wherein the evaporator includes a membranous pad for increasing surface adhesion of the non-pressurized fluid reactant and flow of the fluid.

Claim 33 (cancelled)**Claim 34 (cancelled)****Claim 35 (cancelled)**